



# RESEARCH AND PRACTICE ON THE CONSTRUCTION OF TALENT TRAINING SYSTEM OF PHARMACEUTICAL ENGINEERING

\*Hua Li<sup>1</sup>, Xiaoshuang Chen<sup>2</sup>, Yadong Zhang<sup>1</sup>

<sup>1</sup>School of Chemical Engineering, Zhengzhou University, Zhengzhou, China.

<sup>2</sup>School of Mechanical and Power Engineering, Zhengzhou University, Zhengzhou, China.

## ABSTRACT

This paper aims at how to integrate the talent cultivation program of traditional pharmaceutical engineering with pharmaceutical manufacturing industry, in the face of the development of new business forms of pharmaceutical industry, new technological transformation and new engineering science construction, in order to comprehensively improve the quality of talent cultivation of pharmaceutical engineering specialty in Zhengzhou university, the dynamic regulation mechanism was established from multiple visual angles, such as talent training program of the new engineering specialty, specialty positioning, training objectives, graduation requirements, curriculum system setting, multi-level engineering practice, innovation education system and information teaching, etc., and all-round and three-dimensional way, so as to make it suitable for the development of new pharmaceutical industry.

**KEY WORDS:** new engineering science, pharmaceutical engineering, talent cultivation, research and practice.

## INTRODUCTION:

Pharmaceutical engineering is a cross engineering specialty of chemistry, biology, pharmacy and engineering, which affects the overall level of social development and people's health. In the face of the development of new business forms, new technological transformation and new engineering construction of the pharmaceutical industry, in order to comprehensively improve the training quality of pharmaceutical engineering professionals in Zhengzhou university, this paper aims at how to integrate the talent cultivation program of traditional pharmaceutical engineering with pharmaceutical manufacturing industry, in the face of the development of new business forms of pharmaceutical industry, new technological transformation and new engineering science construction, in order to comprehensively improve the quality of talent cultivation of pharmaceutical engineering specialty in Zhengzhou university, the dynamic regulation mechanism was established from multiple visual angles, such as talent training program of the new engineering specialty, specialty positioning, training objectives, graduation requirements, curriculum system setting, multi-level engineering practice, innovation education system and information teaching, etc., and all-round and three-dimensional way, so as to make it suitable for the development of new pharmaceutical industry; Through the combination of principle guidance and participation demonstration in universities, "point to area" will promote the overall structure optimization, transformation and upgrading, reform and innovation of China's pharmaceutical engineering specialty, and establish a new professional talent training mode in line with the laws of modern engineering education and the characteristics of the times.

Pharmaceutical industry is an important industry supported by China's national strategy. The pharmaceutical industry has the following remarkable characteristics, which are guiding the establishment and development of new business forms of the pharmaceutical industry: 1) new synthesis, catalysis, separation and preparation technologies such as green chemistry, computational chemistry, biocatalysis, modern separation technology and nanotechnology, have made the traditional chemical synthesis of drugs led to the interdisciplinary cross; 2) Modern biological pharmaceutical technology, such as functional genomics, proteomics, bio-informatics and other modern bio-pharmaceutical technologies formed by combining genetic engineering, protein engineering and cell engineering. The R & D and production of new products, new technologies, new processes and new equipment have reached a climax one after another. Biotechnology drugs cause the revolution of pharmaceutical technology because of their high pharmacological activity, low toxic and side effects, high bio-availability and low cost; 3) The aging population and the rapid development of "great health" industry; 4) The new information technology represented by big data, 5G, artificial intelligence, etc. has not only promoted the revolutionary reform of the pharmaceutical industry, but also deeply influenced and led the future development of the pharmaceutical industry; 5) as the unique advantage of Chinese culture and national treasure, especially in COVID-19's prevention and control, Chinese herb has broad prospects for development and huge industrial potential under the "healthy China" strategy, which is pregnant with the new economic growth plateau of the pharmaceutical industry. According to the needs of new economic development, the strategic needs of a powerful country, the construction of pharmaceutical engineering specialty and the cultivation of innovative talents, this paper cooperates with colleges and universities and pharmaceutical enterprises to jointly carry out the research and practice of the construction of the talent training system of pharmaceutical engineering new engineering based on the cross integration of new business forms and new technologies under the background of

new engineering.

## 1. The path route of research and practice on the construction of new engineering talent training system

The project design and implementation path route is shown in Figure 1.

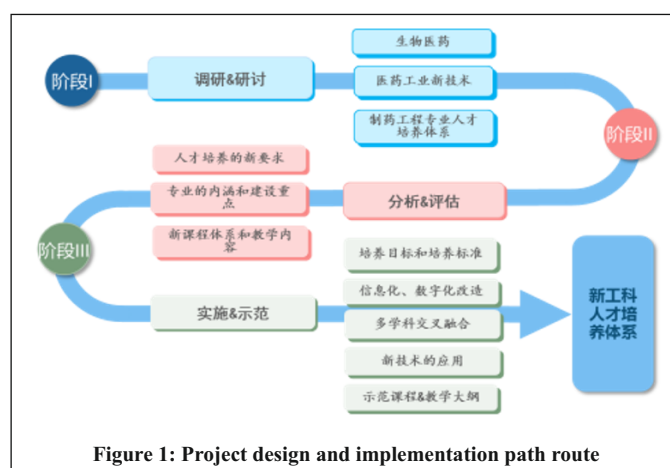


Figure 1: Project design and implementation path route

## 2. Research and Practice on the construction of new engineering talent training system

The teaching reform idea is as following.

- (1) The construction of theory and engineering teaching faculty. The construction of faculty is a powerful guarantee for the completion of first-class specialty and the construction of new engineering course. In the final analysis, the development of majors depends on the introduction and training of talents. On the basis of further improving the teaching level, further improve the ability of scientific research, engineering practice and serving regional economic development, and establish a "double-qualified and double-talented" teacher team. At the same time, actively carry out the integration of practice and education, invite enterprise experts to jointly carry out undergraduate talent training, build a team of engineering tutors, and lay a theoretical and engineering teaching foundation for cultivating "first-class" engineering and technical talents, scientific research talents and innovative talents in management services.
- (2) The formulation and implementation of "new engineering course". Professional talent training program, while strengthening the cultivation of students' basic-knowledge and basic theory, pay attention to the cultivation of students' practical ability, pharmaceutical engineering practice ability and innovation ability, actively create conditions and guide students to carry out scientific research innovation and technological innovation of College Students. According to the positioning goal of "first-class" talents, formulate the training plan and implementa-

tion of "new engineering course" professional talents of pharmaceutical engineering, gradually expand the training scale of the professional talents, subdivide the training direction, and transport "first-class course" engineering and technical talents, scientific research talents and innovative talents of management services for the country and Henan Province.

- (3) Build a curriculum system and courses integrating new technologies such as artificial intelligence, big data, cloud computing and the Internet of things, and intelligent manufacturing methods with the specialty of pharmaceutical engineering.

Combine with artificial intelligence, big data, cloud computing and the Internet of things, and intelligent manufacturing methods with the specialty of pharmaceutical engineering, and the professional teaching mode joined by an industry skilled experts and the multi-dimensional talent training mode based on the intersection of approaches and disciplines have certain innovation.

- (4) Reform of professional experiment content.  
Basic requirements for the reform of professional experiment content and the construction of laboratory is that let students master the basic theories and skills of synthetic pharmacy, traditional Chinese medicine preparation, pharmaceutical preparation technology and engineering; Master drug production equipment and technological process. General principle is that high standard, high starting point, distinctive characteristics, closely combined with the current direction of drug research and development. Update the experimental contents according to the training scheme of "new engineering course" of pharmaceutical engineering.
- (5) The engineering practice and innovation education base construction outside the school.  
Base construction together with domestic well-known enterprises such as Tianfang pharmaceutical, Yuchen pharmaceutical and colleges and universities, jointly build pharmaceutical engineering innovation practice base and Industry-Academia-Research Base, so as to build a platform for cultivating "new engineering course" pharmaceutical engineering talents and building a "double-qualified and double-talented" teacher team. Improve the production practice, draw up the practice plans and practice guidance outlines, and constantly improve the quality and efficiency of engineering practice and innovation education. Pay full attention to students' cognition practice, production practice and graduation practice, strengthen the contact with relevant enterprises, and strive to build a "first-class undergraduate engineering practice and innovation base" of "integration of Industry-Academia and collaborative education".

## CONCLUSION:

Aiming at how to integrate the talent training of traditional pharmaceutical engineering specialty with the overall development situation of pharmaceutical manufacturing industry, this paper constructs an all-round and three-dimensional structure to adapt to the new business form from the perspectives of talent training scheme, professional orientation, training objectives, graduation requirements, curriculum system setting, multi-level Engineering practice innovation education system and information-based teaching. The dynamic regulation mechanism of new technology development makes it suitable for the development of new business types; It is in line with the principle of "combining the reform of pharmaceutical specialty with the upgrading of pharmaceutical specialty" and "promoting the overall transformation and upgrading of China's pharmaceutical specialty" through the guidance of the specific characteristics of the new era.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Acknowledgement:

This work was supported by Research funding from the reform in education project in Zhengzhou University, No.2020zzuJXLX035, No.2021ZZUZY15

## REFERENCES:

- I. Hua Li, Xiaohua Shi, Calculating and Evaluating of the Achievements of Pharmaceutical Separation Engineering Course for Pharmaceutical Engineering Major Based on Engineering Education Certification. *Indian J of Pharmaceutical Education and Research*.2020;54(1):669-673.
- II. Li H, Hu GQ, Hou CH. Innovation of new Engineering Teaching Model of World-Class Universities. *International Education and Research Journal*. 2019;5(6):58-9.
- III. H. Li, W. X. Yu, Z. M. Ma. How to Build World-class University in China: Singapore's Enlightenment [J]. *Journal of China University of Petroleum (Edition of Social Science)*, 2017(33): 86-91.
- IV. Xiaojie Hou, Shanshan Wu, Wei Li, online teaching design and practice of general education courses. *Education Science*, 2020 (6) : 226.
- V. Minniti L. F. S. , Melo J. S. M., Oliveira R. D., Salles J. A. A., The Use of Case Studies as a Teaching Method in Brazil. *Procedia - Social and Behavioral Sciences*, 21 February 237(2017), 373-377. <https://doi.org/10.1016/j.sbspro.2017.02.024>